

**Summary Effects of Trace Elements that Occur
in the Bay/Delta Estuary**

Trace Element	Effects
Cadmium	Carcinogenic/Mutagenic/Teratogenic. Highly toxic in aquatic environments. Bioaccumulates up to 250,000 times concentration in water. Of exceptional toxicity to mammals, including humans.
Copper	Chronically toxic to marine organisms at concentrations in water of 0.01 - 10 ppm. Acutely toxic at concentrations in water greater than 0.1 ppm. Bioaccumulates in shellfish up to 30,000 times concentration in water. Highly bioavailable in the estuary.
Mercury	Teratogenic. Most toxic of all trace elements. Effects occur at low ppb level. Wide range of acute and chronic toxicities to aquatic biota. Bioaccumulates in some aquatic biota at levels 100,000 times that in water.
Selenium	Teratogenic. Toxicity depends greatly on chemical form. Toxic effects occur at concentrations of 10 ppb in freshwater, 1 ppm dry mass in sediments, and 0.3 ppm wet weight in shellfish.
Zinc	Moderately toxic. Chronic toxicity in marine organisms. Acute toxicity to marine and freshwater animals occurs at concentrations in water above 0.1 ppm. Bioaccumulates in shellfish to levels 100,000 times that of water.

Source: Monroe, Michael W., Judy Kelly, and Nina Lisowski. 1992. State of the Estuary. San Francisco Estuary Project. 270 pp.